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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/536,880	03/27/2000	Charles F. Neugebauer	00-S-023	3367

30428 7590 08/30/2005

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EXAMINER	
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ART UNIT	**PAPER NUMBER**
2672	

DATE MAILED: 08/30/2005

19

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/536,880
Filing Date: March 27, 2000
Appellant(s): NEUGEBAUER, CHARLES F.

Stephen Bongini
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 2/14/2005 which is copy of the 8/9/2004 brief.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 3, 5-10, 12-16, 18-22, 24, and 25 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8). The brief groups these claims into three groups.

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

6,044,178	Lin	3-2000
6,088,489	Miyake	7-2000

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 5, 3, 6, 8, 10, 12, 14, 16, 18, 20, 22, and 24 are rejected under 35 U.S.C. 102(e) as being anticipated by Lin, U.S. Patent No. 6,044,178. Figures 2 and 3, column 1 lines 6-12, column 2 lines 56-67 and column 5 line 58 to column 6 line 4 describes scaling a source image to produce a destination image. The following detailed analysis illustrates how Lin teaches applicants claimed invention.

Claim 5:

Lin teaches a method for scaling a source image (figure 2, S) to produce a scaled destination image (figure 3, output of image merging unit 96), said method comprising the steps of calculating a local context metric from a local portion of the source image (*column 2 lines 56-58, column 4 lines 47-50, and column 5 lines 5-12 and*

21-34, text segmentation unit 58 and image separation unit 66, Lin divides the image into tiles and determines the tile's metric); generating a convolution kernel from a plurality of available convolution kernels (*column 6 lines 21-22, 37 and 58*) based on the calculated local context metric (*depending upon the tile's values one of three convolution kernels is selected to be applied to the tile*); using the generated convolution kernel to generate at least one pixel of the scaled destination image (*column 6 lines 22-24, 37-42, 58-63*), the scaled destination image having a different resolution than the source image (*down sampled image has less pixels than the source image*), wherein the available convolution kernels include at least one smoothing kernel (*the coefficients at column 6 lines 21-22 has 1/10 at the boundary which brings more of the distant pixel into the new pixel*) and at least one sharpening kernel (*and the coefficient at column 6 line 38 has 1/15 at the boundary which brings less of the distant pixel into the new pixel and has 7/15 in the middle pixel which brings more of the middle pixel into the new pixel*).

Claim 3:

Lin does teaches storing at least two convolution kernels in a memory, however at column 8 lines 10-32 and 40-45 Lin describes the functions of figure 3 are performed by a computer and associated software. Thus, the software at lines 40-45 would need to include the coefficients for the function of the image processor to be performed and the hard disk storing the software is a memory. Thus, in the software embodiment, the hard disk stores at least two convolution kernel coefficients. and in the generating step,

either one of the stored convolution kernels is selected or another convolution kernel is generated by interpolating the stored convolution kernels.

Claim 6:

This claim claims wherein the local context metric has more than two possible values. Lin teaches this by filtering the white and black character and the background image separately, thus, Lin teaches three possible values for the context metric.

Claim 8:

This claim is a machine readable medium claim claiming the same functions of method claim 5, thus, this claim is rejected for the reasons given for claim 5 and in view of the discussion of software by Lin at column 8 lines 10-32 and 40-45.

Claim 10:

Lin teaches storing all available convolutions (*two, one for the background and one for the text*) in a memory (*column 8 lines 10-32 and 40-45*) wherein in the generating step, one of the stored convolution kernels is selected based on the calculated local context metric. Lin does teach storing at least two convolution kernels in a memory, at column 8 lines 10-32 and 40-45 Lin describes the functions of figure 3 are performed by a computer and associated software. Thus, in the software embodiment, the hard disk stores at least two convolution kernel coefficients and in the generating step, either one of the stored convolution kernels is selected.

Claim 12:

This claim claims wherein the local context metric has more than two possible values. Lin teaches this by filtering the white and black character and the background image separately, thus, Lin teaches three possible values for the context metric.

Claim 14:

Lin teaches an image scaling device (*figures 2 and 3*) that receives pixels of a source image (*figure 2, S*) and outputs pixels of a scaled destination image (*figure 3, output of image merging unit 96*), said image scaling device comprising: a context sensor (*column 2 lines 56-58, column 4 lines 47-50, and column 5 lines 5-12 and 21-34, text segmentation unit 58 and image separation unit 66, Lin divides the image into tiles and determines the tile's metric*) for calculating a local context metric based on local source image pixels (*depending upon the tile's values one of three convolution kernels is selected to be applied to the tile*); a kernel generator (*source of coefficients*) coupled to the context sensor, the kernel generator generating a current convolution kernel from a plurality of available convolution kernels (*column 6 lines 21-22, 37 and 58*) based on the local context metric calculated by the context sensor; and a scaler (*78,86,72*) coupled to the kernel generator, the scaler receiving the coefficients of the current convolution kernel from the kernel generator, and using the coefficients to generate at least one pixel of the scaled destination image from pixels of the source image (*column 6 lines 22-24, 37-42, 58-63*) , the scaled destination image having a different resolution than the source image (*down sampled image has less pixels than the source image*), wherein the available convolution kernels include at least one smoothing kernel (*the*

coefficients at column 6 lines 21-22 has 1/10 at the boundary which brings more of the distant pixel into the new pixel) and at least one sharpening kernel (*and the coefficient at column 6 line 38 has 1/15 at the boundary which brings less of the distant pixel into the new pixel and has 7/15 in the middle pixel which brings more of the middle pixel into the new pixel*).

Claim 18:

This claim claims wherein the local context metric has more than two possible values. Lin teaches this by filtering the white and black character and the background image separately, thus, Lin teaches three possible values for the context metric.

Claim 16:

Lin teaches an image scaling device (*figures 2 and 3*) that receives pixels of a source image (*figure 2, S*) and outputs pixels of a scaled destination image (*figure 3, output of image merging unit 96*), said image scaling device comprising: a context sensor (*column 2 lines 56-58, column 4 lines 47-50, and column 5 lines 5-12 and 21-34, text segmentation unit 58 and image separation unit 66, Lin divides the image into tiles and determines the tile's metric*) for calculating a local context metric based on local source image pixels (*depending upon the tile's values one of three convolution kernels is selected to be applied to the tile*); a kernel generator (*source of coefficients*) coupled to the context sensor, the kernel generator generating a current convolution kernel from a plurality of available convolution kernels (*column 6 lines 21-22, 37 and 58*) based on the local context metric calculated by the context sensor; and a scaler (*78,86,72*) coupled to the kernel generator, the scaler receiving the coefficients of the current

convolution kernel from the kernel generator, and using the coefficients to generate at least one pixel of the scaled destination image from pixels of the source image (*column 6 lines 22-24, 37-42, 58-63*) , the scaled destination image having a different resolution than the source image (*down sampled image has less pixels than the source image*), wherein the available convolution kernels include at least one smoothing kernel (*the coefficients at column 6 lines 21-22 has 1/10 at the boundary which brings more of the distant pixel into the new pixel*) and at least one sharpening kernel (*and the coefficient at column 6 line 38 has 1/15 at the boundary which brings less of the distant pixel into the new pixel and has 7/15 in the middle pixel which brings more of the middle pixel into the new pixel*), the kernel generator stores (*column 8 lines 10-32 and 40-45*) all available convolution kernels (*two, one for the background and one for the text*), and the kernel generator selects one of the stored convolution kernels as the current convolution kernel based on the calculated local context metric. Lin does teach storing at least two convolution kernels in a memory, at column 8 lines 10-32 and 40-45 Lin describes the functions of figure 3 are performed by a computer and associated software. Thus, the software at lines 40-45 would need to include the coefficients for the function of the image processor to be performed and the hard disk storing the software is a memory. Thus, in the software embodiment, the hard disk stores at least two convolution kernel coefficients and in the generating step, either one of the stored convolution kernels is selected or another convolution kernel is generated by interpolating the stored convolution kernels.

Claim 20:

This claim is very similar to claim 14 with the differences being this claim claims in the preamble "A display device" rather than "An image scaling device" and claims at line 11 "a display for displaying the scaled destination image". Lin teaches these claimed features in the LCD panel 100 illustrated in figure 3.

Claim 22:

Lin teaches wherein the kernel generator stores (*column 8 lines 10-32 and 40-45*) all available convolution kernels (*two, one for the background and one for the text*), and the kernel generator selects one of the stored convolution kernels as the current convolution kernel based on the calculated local context metric. Lin does teach storing at least two convolution kernels in a memory, at column 8 lines 10-32 and 40-45 Lin describes the functions of figure 3 are performed by a computer and associated software. Thus, the software at lines 40-45 would need to include the coefficients for the function of the image processor to be performed and the hard disk storing the software is a memory. Thus, in the software embodiment, the hard disk stores at least two convolution kernel coefficients and in the generating step, either one of the stored convolution kernels is selected.

Claim 24:

Lin teaches an LCD panel 100.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 9, 15 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin, U.S. Patent No. 6,044,178, in view of Miyake, U.S. Patent No. 6,088,489. Claim 15 claims The image scaling device as defined in claim 14, wherein the context sensor calculates a local context metric for each pixel in the destination image. Claims 9 and 21 claims the same limitations except for their dependency. Lin does not teach calculating a local context metric for each pixel in the destination image. Lin at column 5 lines 5-12 teaches calculating a local context metric for a tile and at column 5 lines 35-44 teaches calculating a local context metric for each line. Thus, Lin teaches that various sized areas of the image may be analyzed to calculate a local context metric. Miyake at column 9 line 55 teaches calculating a local context metric for each pixel in the destination image. It would have been obvious to one of ordinary skill in the art at the time the invention was made to calculate a local context metric for each pixel since this will provide for better down sampling of the source image into the destination image.

Claims 7, 13, 19 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin, U.S. Patent No. 6,044,178, in view of Miyake, U.S. Patent No.

6,088,489. These dependent claims are very similar and only differ due to their dependency and type of claim, eg. method, device, etc. Lin teaches a complete sharpening kernel and the complete smoothing kernel as described in the rejection of claim 14. In addition the term complete is read to mean a complete kernel capable of sharpening or complete kernel capable of smoothing.

Lin fails to teach the following limitation of claims 7, 13, 19 and 25 "a plurality of other kernels that provide a transition between the complete sharpening kernel and the complete smoothing kernel".

Miyake describes a filtering system that selects a kernel based upon local properties of the image.

Miyake teaches the available convolution kernels include at least one smoothing kernel (*column 9 lines 51-55, to prevent the fine lines from being cut, a smoothing kernel is inherently used*) and at least one sharpening kernel (*column 9 lines 51-55, to prevent the corners from being smoothed , a sharpening kernel is inherently used*).

Since Miyake teaches selecting from among a plurality of filters a filter necessary to filter the image then Miyake suggests a plurality of kernels between smoothing and sharpening.

Thus, it would have been obvious to one of ordinary skill in the art at the time of applicants invention to have a plurality of other kernels in Lin that provide a transition between the complete sharpening kernel and the complete smoothing kernel because this will allow Lin to filter images having inseparable text and background or inseparable white and black text or lines and corners.

(11) Response to Argument

Appellants argument A have been fully considered, but, they are deemed not persuasive to overcome the rejection of claims 3, 5, 6, 8, 9, 10 and 12. Of these claims, claims 5 and 8 are independent claims. Claim 5 is a method claim and claim 8 is a machine-readable medium claim claiming the same steps present in method claim 5. On pages 5 to10 of the brief appellant considers method claim 5. Appellant discusses Lin at pages 5-6. Appellant discusses the examiner's position at pages 7 first full paragraph and discusses appellants position at page 6 last full paragraph, paragraph spanning pages 6 and 7 and page 7 last full paragraph to page 10. Lin does use the words low pass filter when referring to filters 78 and 86, however, the coefficients 1/15, 3/15, 7/15, 3/15, 1/15 imply a high pass filter. A high pass filter passes more of the center pixel's value than does a low pass filter. Filters 78 and 86 pass more of the center pixel's value than does filter 72. Column 6 lines 37-40 specifically states with regard to text filter 78 "help to maintain the higher-frequency attributes of the text". Thus, appellant's characterization of filters 78 and 86 as performing the same smoothing effect that filter 72 performs is not seen in the Lin reference. Appellant's specification at page 8 lines 6-13 describes using Gaussian convolution kernel for smoothing and describes using cubic convolution kernel for sharpening. However the claims do not specifically claim using a cubic convolution kernel for sharpening. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26

USPQ2d 1057 (Fed. Cir. 1993). Since the claims are not limited to a cubic convolution kernel then the claimed sharpening kernel is claiming kernels that perform sharpening in addition to the cubic convolution kernel and covers a kernel that maintains sharpness during the scaling. Lin's kernel used for text maintains sharpness during the scaling. A high pass filter passes more of the center pixel's values than the surrounding pixel values and a sharpening filter does the same thing. As discussed above Lin's filters 78 and 86 maintain the high frequency attributes of the text. Some sharpening filters may use negative coefficient values for the surrounding pixels, see applicants specification at page 2 lines 6-22, but sharpening filters are not limited to these kernels since any kernel that emphasizes the center pixel will be a sharpening filter. A high pass filter is a sharpening filter, see US Patent No. 5,396,285 at column 5 lines 55-56 which states "sharpening can be accomplished by providing some high pass filtering or peaking".

On page 7 last paragraph of the brief appellant states at lines 7-8 of that paragraph "the sharpening kernel makes the pixel less like its neighbors, which increases detail and noise". The kernel used in filters 78 and 86 makes the pixel less like its neighbors and since this kernel's purpose is to maintain the higher-frequency attributes of the text then Lin's kernel meets appellants definition of sharpening. Therefore, Lin teaches appellants broadly claimed sharpening kernel.

Thus, appellant's claimed sharpening kernel is met by a high pass kernel which is taught by Lin's high pass kernel used in filters 78 and 86.

Appellants argument B have been fully considered, but, they are deemed not persuasive to overcome the rejection of claims 14, 15, 16, 18, 20, 21, 22, and 24. Of these claims, claims 14, 16, and 20 are independent claims. Claims 14, 16, and 20 are device claims. On pages 11 and 12 of the brief appellant considers device claim 14. Appellant alleges that Lin and Miyake, alone or in combination, fail to teach or suggest an image scaling device that includes a kernel generator for generating a current convolution kernel from a plurality of available convolution kernels based on a local context metric, and a scaler for receiving coefficients of the current convolution kernel for the kernel generator and using these coefficients to generate at least one pixel of the scale destination image, with the available convolution kernels including at least one smoothing kernel and at least one sharpening kernel. Appellant's allegation is not persuasive because Lin teaches an image scaling device (*Figures 2 and 3 illustrate an image scaling device.*) that includes a kernel generator (*The source of coefficients for filters 72, 78, and 86 is a generator.*) for generating a current convolution kernel from a plurality of available convolution kernels (*Column 6 lines 21-22, 37 and 58 describes at least kernels which are generated to provide a current convolution kernel to the filter based upon whether text or background is being scaled.*) based on a local context metric, and a scaler (*78,86,72*) for receiving coefficients of the current convolution kernel for the kernel generator and using these coefficients to generate at least one pixel of the scale destination image (*Column 6 lines 22-24, 37-42, 58-63 teaches using the kernels to down sample the source image to the scale of the destination image.*), with the available convolution kernels including at least one smoothing kernel and at

least one sharpening kernel (*See the discussion given above for argument A.*). Therefore, argument B is not persuasive.

Appellants argument C have been fully considered, but, they are deemed not persuasive to overcome the rejection of dependent claims 7, 13, 19, and 25. These dependent claims are nearly identical except for parentage and statutory class, method or machine-readable, or device. On pages 12 and 13 of the brief appellant considers method claim 7. Appellant alleges that Line and Miyake, alone or in combination, fail to teach or suggest a method or device for producing a scale destination image in which the available convolution kernels include a complete smoothing kernel, a complete sharpening kernel, and a plurality of other kernels that provide a transition between the complete sharpening kernel and the complete smoothing kernel. This allegation is not persuasive because:

1) Lin teaches a complete sharpening kernel and a complete smoothing kernel as discussed above for argument A. Applicant has not defined a "complete" sharpening kernel and a "complete" smoothing kernel. Therefore, the term complete is read to mean a complete kernel capable of sharpening or a complete kernel capable of smoothing;

2) Lin fails to teach the following limitation of claims 7, 13, 19 and 25 "a plurality of other kernels that provide a transition between the complete sharpening kernel and the complete smoothing kernel".

3) Miyake describes a filtering system that selects a kernel based upon local properties of the image. Miyake teaches the available convolution kernels include at least one smoothing kernel (*Column 9 lines 23-26 explicitly discusses smoothing filters.*) and at least one sharpening kernel (*Column 9 lines 26-34, 41-45, and 51-55 teaches to one of ordinary skill in the art when filtering by a smoothing filter will not provide the correct results then another filter is selected and since preventing, when filtering of slender lines and corners, the slender lines and corners from being smoothed is desired then a sharpening kernel is inherently used.*).

4) Since Miyake teaches selecting from among a plurality of filters a filter necessary to filter the image then Miyake suggests a plurality of kernels between smoothing and sharpening.

5) Thus, it would have been obvious to one of ordinary skill in the art at the time of applicants invention to have a plurality of other kernels in Lin that provide a transition between the complete sharpening kernel and the complete smoothing kernel because this will allow Lin to filter images having inseparable text and background or inseparable white and black text or lines and corners.

For the above reasons Line and Miyake teach "a plurality of other kernels that provide a transition between the complete sharpening kernel and the complete smoothing kernel". Therefore, argument C is not persuasive.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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August 19, 2005

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